IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Alexander E. Smith et al.**	Docket No.: **RANN-0017** RPB REF: **RANN-0017**
Serial Number: **10/756,799**	Art Unit: **3662**
Filing Date: **January 14, 2004**	Examiner: **PHAN, DAO LINDA**
Title: **Minimum Safe Altitude Warning**	

BRIEF ON APPEAL (SMALL ENTITY)

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

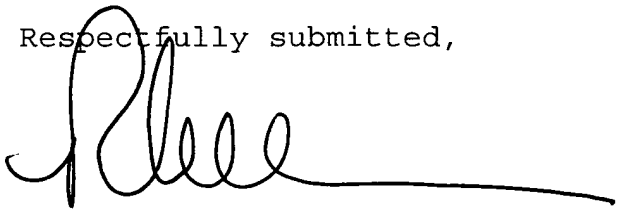
Transmitted herewith is a Brief on Appeal (3 copies) in the above-identified application.

1. An Oral Hearing is not requested.

2. A Credit Card Authorization in the amount of **$250.00** to cover the Appeal Brief Fee is enclosed.

3. The Commissioner is hereby authorized to charge any additional fees associated with this communication, including patent application filing fees and processing fees under 37 C.F.R. § 1.16 and 1.17, or credit any overpayment to **Deposit Account No. 50-1393.**

Respectfully submitted,



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June 1, 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial Number: **10/756,799**	Art Unit: **3662**
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Title: **MINIMUM SAFE ALTITUDE WARNING**	

BRIEF ON APPEAL

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

Further to the NOTICE OF APPEAL dated March 1, 2006 in the above-captioned application, applicant hereby submits this BRIEF ON APPEAL.

(1) Real party in interest

The real party in interest in this appeal is RANNOCH CORPORATION, 5252 Cherokee Avenue Suite 400, Alexandria, Virginia 22312, Assignee and owner of 100% interest in the present Patent application.

(2) Related appeals and interferences

There are no related appeals or interferences at the present time.

(3) Status of claims

A statement of the status of all the claims, pending or canceled, and identifying the claims appealed.

Claims 1-62 are now pending in the above-captioned application. All of claims 1-62 have been rejected in view of Prior Art.

(4) Status of amendments

All prior amendments to the Specification and Claims have been entered, to the best of applicant's knowledge.

Applicant submits herewith an Amendment to correct the dependency of claim 13, which was listed as being dependent upon itself. Claim 13 should have been dependent on claim 12. A noted error in the dependency of Claim 25 was also corrected. Applicant respectfully requests that this Amendment be entered to correct these obvious typographical errors.

(5) Summary of invention

Controller Flight Into Terrain (CFIT) is one of the leading causes of aviation accidents. When pilots lack situational awareness, it is possible to fly an aircraft, under control, into the ground. The risk of such accidents can be greatly reduced through the installation of CFIT avionics, which warn the flight crew when they are at risk of a CFIT accident. However, such avionics are cost-prohibitive for installations on smaller aircraft, including typical general aviation aircraft. In such aircraft, additional aviation electronics adds to the weight and clutter of the cockpit area.

Prior Art CFIT avionics provided an on-board database of ground terrain which was then compared with data from an on-board navigational computer. While such systems could work, they required a huge database of ground data, which would need to be updated constantly, as new structures and obstructions are built. Moreover, it could provide a false sense of security to a pilot, as if the pilot flies into an area not covered by the ground terrain database, no CFIT warnings would be provided.

Rannoch, Corporation, Assignee of the present application (and a number of other related applications and Patents) has developed a technique for tracking aircraft using multilateration. Multilateration determines the position of an aircraft using a ground-based system, which measured the Time Difference of Arrival (TDOA) of radio signals from an aircraft, and then determines aircraft position.

Using this multilateration technology, a ground-based CFIT warning system provides pilots with CFIT alerts. The system is based upon a ground-based tracking system, which provides surveillance of aircraft, such as the AirScene™ multilateration system manufactured by Rannoch Corporation of Alexandria, Virginia. The system monitors both horizontal and vertical positions of aircraft. When an aircraft has been determined to be operating below safe altitudes, or too close to

obstructions, the pilot is provided with a warning. The warning may be delivered via the pilot's voice communications and/or a data link or the like.

The method and apparatus of the present invention offer many advantages over the prior art of record. For example, the system of the present invention does not require any special aircraft equipage other than conventional transponders and radio gear. The present invention provides warnings directly to the pilot (not to an air traffic controller). The present invention can also work where there is limited or no conventional radar coverage (such as small municipal airports or the like). Moreover, the present invention can use either (or both) barometric or calculated altitude to determine proximity warnings.

The concept of the present invention may also be applied to other types of collision warning systems. In particular, the present invention can track multiple aircraft and provide warnings if two or more aircraft appear to be on a collision course, and advise each pilot of appropriate action to take. The apparatus of the present invention may also be used to prevent collisions on the ground with other aircraft or service vehicles or the like. A pilot may be warned when an aircraft or vehicle is in the path or on a collision course with the aircraft. The present invention can also be used to warn pilots if they are violating noise profile contours, noise abatement procedures, or the like, and thus help reduce airport noise complaints.

It should also be noted that while the primary embodiment was driven by applicant's Multilateration technology, the concept of a ground-based warning system can be applied using other aircraft tracking technologies (e.g., radar) as well.

(6) Issues

Applicant contends that the remaining issues on appeal are as follows:

Whether claims 1-62 are anticipated under 35 U.S.C. §102(b) by Brame, U.S Patent No. 4,224,669.

Whether Claims 1-62 are anticipated under 35 U.S.C. §102(e) by Bateman, U.S. Patent No. 6,445,310.

(7) Grouping of claims

Each claim contains limitations varying in scope, and thus should be considered separately on their merits. It should be noted that the claims are presented in two series of 31 claims each. Claims 1-31 present SYSTEM claims (claim 1 independent) and claims 32-62 present corresponding METHOD claims (claim 32 independent). Thus, in analyzing the claims, it may be convenient to understand this arrangement. However, SYSTEM and METHOD claims have different scopes of protection, and thus cannot be considered equivalent to one another. Moreover, the dependent claims vary in scope and recite patentably distinct limitations.

For example, the only two independent claims 1 and 32 recite a ground-based system and method (respectively) for tracking an aircraft and providing warnings to the aircraft.

Dependent claims 2-7 and 33-38 claim different types of ground tracking systems, which may be employed with the present invention.

Dependent claims 8-10, 14-16, 20-22, 26-28, 39-41, 46-48, 52-54, 58-60 claim different types of criteria that the aircraft track may be compared to, in order to generate a warning (e.g., MSAW, Collision, Noise Profile).

Dependent claims 11-13, 17-19, 23-25, 29-31, 42-45, 49-51, 55-57, and 60-62 claim different warning types (e.g., audio, visual, data display).

Although these dependent claims may contain similar recitations, their dependencies are different, and thus, none of the claims have the exact same scope of protection.

Thus, applicant submits that none of the claims stand or fall together.

(8) Argument

(i)35 U.S.C. §112, first paragraph

There are no pending rejections under 35 U.S.C. §112, first paragraph.

(ii) 35 U.S.C. §112, second paragraph

There are no pending rejections under 35 USC §112, first paragraph in the above-captioned application.

(iii) 35 U.S.C. 102

Claims 1-62 were rejected under 35 U.S.C. §102(b) as being anticipated by Brame, U.S. Patent No. 4,224,669. Applicant respectfully traverses this rejection.

Claims 1-62 were rejected under 35 U.S.C. §102(e) as being anticipated by Bateman, U.S. Patent No.6,445,310.

In order to be complete, an anticipation-type rejection must contain two elements:

1. The reference must qualify as "Prior Art" under one of the sections of 35 U.S.C. §102; and

2. The reference must explicitly teach *ALL* of the features of the claimed invention.

The Brame reference cited by the Examiner have effective dates more than one year prior to applicant's filing date. However, none of the references teach all of the claimed elements of the present invention, namely a ground-based warning system. Thus, the §102 rejections fail.

Each reference is applied separately, and thus will be addressed one at a time.

The claims of the present application recite a ground-based system and method in the preamble. Applicant appreciates that some Examiners do not give any weight to limitations in the preamble in the claim. Applicant has amended the claims to recite that the tracking means comprises a ground-based system, a feature neither taught nor suggested by Brame or Bateman.

Brame, U.S. Patent No. 4,224,669, issued September 23, 1980 discloses a Minimum Safe Warning, Indication and Warning System. This reference discloses an aircraft-mounted system, which relies upon a database in the aircraft to detect when MSAW warnings should be given.

This Patent describes the systems known in the art as defined in the BACKGROUND of the Specification of the present application. In particular, Brame discloses an aircraft Terrain Advisory System which relies upon a database of terrain of interest, all mounted on or in the aircraft. As noted in the BACKGROUND of the present application, this system suffers from the problems weight, cost, maintenance, complexity with the additional disadvantage that each aircraft database would have to be updated when new obstructions (buildings, towers, etc.) are constructed near an airport.

Weight in an aircraft is always a critical issue, and no more so than in small, general aviation (GA) and light commercial aircraft. Cost is also an important issue, as is maintenance. As set forth in the Specification of the present application, the ground-based system of the present invention can determine whether an aircraft has fallen below minimum safe altitude (or other parameters) and warn the pilot. Heavy cumbersome electronics and systems are not required.

The Examiner argues (Office Action of November 1, 2005, Page 2) that Brame discloses a ground-based system, and relies upon Col. 7, lines 29 *et seq* and element 10a to show this alleged ground-based system. However, the section quoted from Brame discloses only a *ground track*, which is a term known in the art, referring to the track of an aircraft, as projected downward onto the terrain below.

The Specification of Brame makes it quite clear to one of ordinary skill in the art that this system is aircraft-mounted. The system is described as working from a conventional navigation computer 10a (Col. 7, line 34, Col. 2, line 57, Col. 4, line 55). A Navigation computer, as known to one or ordinary skill in the art, is a device mounted on an aircraft, not ground-based. Moreover, none of the Figures show any type of ground-based system or communications link from a ground-based system to an aircraft, or any ground-based system for detecting aircraft position. One cannot take from Brame any sort of teaching of a ground-based system.

Thus, there is no basis for the Examiner's argument that Brame teaches or suggests any sort of ground-based system. And the distinction is more than trivial as noted above. The

present invention allows all aircraft owners, even small General Aviation aircraft owners, with a transponder and a radio to receive MSAW, collision, or other airspace warnings, without having to invest in heavy and cumbersome avionics, updated databases, or the like.

Applicant also notes that some of the features of the dependent claims do not appear to be taught by Brame. Brame does not teach or suggest collision avoidance warnings or noise abatement warnings, for example. Brame appears to be directed toward MSAW (minimum safe altitude warnings) only. The dependent features were not addressed specifically by the Examiner.

Again, the claims of the present invention have been amended to make it clear that the present system uses a ground-based tracking system, not a system located in the aircraft. In addition, it does not appear that Brame discloses anything other than terrain awareness. Thus, other applications such as collision avoidance, noise abatement profile warning, and the like do not appear to be taught by Brame.

* Bateman, U.S. Patent No. 6,445,310 was applied in a 102(e) rejection, as the effective date of this application does not appear to predate applicant's earliest filing date. However, applicant need not address the date issue at the present time (but reserves the right to swear behind this reference if appropriate and permissible) as the reference also appears to be an aircraft-mounted system.

Bateman appears to teach little more than an improved CFIT avoidance terrain profile, which can be used in a terrain avoidance system. While this profile may or may not be an improvement over the Prior Art, it does not appear to teach or suggest a ground-based system.

The Examiner argues that Bateman does teach a ground-based system, and relies upon Bateman Col. 1, lines 14-20 and Col 1 lines 29 *et seq.* to buttress this supposition. However, examination of the cited portions of Bateman reveal that they only mention the term *ground proximity* which is a term referring to the distance between the aircraft and the ground, not an indication of any ground-based apparatus.

Bateman teaches only an improved *envelope* for ground detection and avoidance. Bateman nowhere teaches or suggests a ground-based system, and given that he describes an improved envelope for use with Prior Art devices, it is clear that he intends his envelope to be used with such devices.

In fact, Bateman explicitly recites which device he intends his improved envelope to apply to – the apparatus described in Muller et al;, U.S. Patent No. 5,839,080 (Bateman, Col, 2 line 33-56). Bateman's Figure 4 block diagram and the cited Muller Patent both describe an on-board terrain avoidance system using aircraft avionics and sensors to determine aircraft position and then use a terrain database system to generate warnings (See, e.g., Muller, Figures 1A and 1B which show the overall system). No mention is made of any communications link for sending warnings from the ground to a pilot.

It should be noted that Bateman, Brame, and Muller do not explicitly state " the apparatus is mounted entirely on the aircraft" or language to that effect. However, again, one of ordinary skill in the art understands that these Patents describe the current state of the art (onboard) systems for collision avoidance as prescribed in present FAA regulations. References to onboard airspeed indicators, GPS systems, and the like, as well as the emphasis on placing the ground terrain database into a small memory, make it clear (to one of ordinary skill in the art) that these systems are describing aircraft-mounted apparatus. Moreover, the lack of any reference to communications links to and from the aircraft to a ground-based system in any of the drawings or description make it clear that the system is self-contained on the aircraft.

But what is more important, from an Examination point of view, is that none of the references explicitly state or imply that the system could be ground-based, in whole or in part. The Examiner cannot rely upon an *omission* from a reference as a teaching of a claimed feature of the present invention. Absent an explicit teaching of such a feature, the §102 rejection cannot be sustained.

Nor could the Examiner argue such a feature is "obvious" (While no obviousness rejection has been raised, it behooves applicant to anticipate the Board inquiring into such arguments and/or the Examiner raising such arguments in a Reply Brief). Until now, the FAA-mandated approach for aircraft collision avoidance, minimum safe altitude indication, and the like has been to burden aircraft with more and more complex and expensive electronics. While such a solution may be suitable for large commercial airliners, it leaves vulnerable less complex aircraft such as General Aviation aircraft. Moreover, it burdens light commuter aircraft with heavy and complex electronics, which drive up the cost and complexity of such aircraft.

The present inventors have taken the entire problem and reversed the entire premise. Instead of placing more and more equipment on the aircraft, a ground-based system can track aircraft and supply warnings to pilots using conventional radio or data links. Such a system is more egalitarian, as it provides warnings to pilots of all aircraft with minimum radio and transponder equipment. Moreover, it reduces the cost and complexity of aircraft electronics by eliminating the need for expensive onboard systems (which become obsolete rather rapidly). In addition, airports can update ground-based terrain and airspace databases in real time, so pilots are not relying upon potentially dangerous outdated onboard databases.

None of the references cited by the Examiner teach or suggest the ground-based system of the present invention as recited in the claims as amended. In addition, none of the references teach all of the ancillary features of the present invention as set forth in the dependent claims. As such, the claims as presently presented are now in condition for allowance.

(iv) 35 U.S.C. 103.

There are no pending rejections under 35 U.S.C. §103.

(v)Other Rejections

There are no other rejections pending in the above-captioned application.

CONCLUSION

None of the references cited by the Examiner teach or suggest the ground-based system of the present invention as recited in the claims as amended. In addition, none of the references teach all of the ancillary features of the present invention as set forth in the dependent claims. As such, the claims as presently presented are now in condition for allowance.

Applicant respectfully submits that all of claims 1-62 are presently in condition for allowance. Applicant respectfully requests that the Board overturn the Examiner's outstanding rejections and instruct the Examiner to allow the claims on Appeal.

The Commissioner is hereby authorized to charge any additional fees associated with this communication, including patent application filing fees and processing fees under 37 C.F.R. § 1.16 and 1.17, or credit any overpayment to **Deposit Account No. 50-1393.**

Respectfully submitted,

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June 1, 2006

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(9) Appendix 1 – List of Related Appeals and Interference Decisions by Board or Courts

This Appendix is blank, as there are no related Appeals or Interferences. However, under Rule 41.37, if there are any decisions rendered by a court or the Board in the proceeding identified in the "Related Appeals and Interferences" section, the filer is required to provide copies of those decisions in an Appendix. It has come to Applicant's attention that some Examiners are requiring a blank Appendix listing such non-existant decision.

Thus, applicant submits this blank appendix to comply with this requirement.

Appendix 2: Copies of Evidence Relied Upon by Appellant

This is a blank Appendix.

Appendix 3: Claims on Appeal

The following claims 1-62 are involved in this appeal:

1. (PREVIOUSLY PRESENTED) A ground-based system for tracking and warning aircraft, comprising:

a ground-based system for tracking at least one aircraft to determine aircraft position and altitude;

a ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned; and

means for warning the at least one aircraft.

2. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the ground-based system for tracking comprises a 3-D multilateration system for determining aircraft position and altitude.

3. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the ground-based system for tracking comprises a 2-D multilateration system for determining aircraft position and a means for receiving transponder data to determine aircraft altitude.

4. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the ground-based system for tracking comprises an active radar system.

5. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the ground-based system for tracking comprises a passive radar system.

6. (PREVIOUSLY PRESENTED) The system of claim 2, wherein the 3-D multilateration system determines aircraft position, altitude, track and speed.

7. (PREVIOUSLY PRESENTED) The system of claim 3, wherein the 2-D multilateration system determines aircraft position, track, and speed.

8. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position and altitude to a minimum safe altitude profile and determining that the at least one aircraft should be warned if the altitude of the at least one aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

9. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the position and altitude of a first of the at least one aircraft with the position and altitude of a second of at least one aircraft and determining that the at least one aircraft should be warned if the position and altitude of the first of the at least one aircraft and the position and altitude of the second of the at least one aircraft are within a predetermined range of one another.

10. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position and altitude to an airport noise profile and determining that the at least one aircraft should be warned if the position and altitude of the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

11. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the means for warning the at least one aircraft comprises a means for generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

12. (PREVIOUSLY PRESENTED) The system of claim 1, wherein the means for warning the at least one aircraft comprises a means for generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

13. (PREVIOUSLY PRESENTED) The system of claim 12, wherein the means for warning the at least one aircraft comprises a digital data link to the aircraft, wherein digital warning data are broadcast to the aircraft from the ground, and the digital warning data is displayed on an aircraft cockpit display.

14. (PREVIOUSLY PRESENTED) The system of claim 2, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to

determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position and altitude to a minimum safe altitude profile and determining that the at least one aircraft should be warned if the altitude of the at least one aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

15. (PREVIOUSLY PRESENTED) The system of claim 2, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the position and altitude of a first of the at least one aircraft with the position and altitude of a second of at least one aircraft and determining that the at least one aircraft should be warned if the position and altitude of the first of the at least one aircraft and the position and altitude of the second of the at least one aircraft are within a predetermined range of one another.

16. (PREVIOUSLY PRESENTED) The system of claim 2, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position and altitude to an airport noise profile and determining that the at least one aircraft should be warned if the position and altitude of the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

17. (PREVIOUSLY PRESENTED) The system of claim 2, wherein the means for warning the at least one aircraft comprises a means for generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

18. (PREVIOUSLY PRESENTED) The system of claim 2, wherein the means for warning the at least one aircraft comprises a means for generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

19. (PREVIOUSLY PRESENTED) The system of claim 18, wherein the means for warning the at least one aircraft comprises a digital data link to the aircraft, wherein digital warning data are broadcast to the aircraft from the ground, and the digital warning data is displayed on an aircraft cockpit display.

20. (PREVIOUSLY PRESENTED) The system of claim 3, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position and altitude to a minimum safe altitude profile and determining that the at least one aircraft should be warned if the altitude of the at least one aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

21. (PREVIOUSLY PRESENTED) The system of claim 3, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the position and altitude of a first of the at least one aircraft with the position and altitude of a second of at least one aircraft and determining that the at least one aircraft should be warned if the position and altitude of the first of the at least one aircraft and the position and altitude of the second of the

at least one aircraft are within a predetermined range of one another.

22. (PREVIOUSLY PRESENTED) The system of claim 3, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position and altitude to an airport noise profile and determining that the at least one aircraft should be warned if the position and altitude of the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

23. (PREVIOUSLY PRESENTED) The system of claim 3, wherein the means for warning the at least one aircraft comprises a means for generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

24. (PREVIOUSLY PRESENTED) The system of claim 3, wherein the means for warning the at least one aircraft comprises a means for generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

25. (PREVIOUSLY PRESENTED) The system of claim 24, wherein the means for warning the at least one aircraft comprises a digital data link to the aircraft, wherein digital warning data are broadcast to the aircraft from the ground, and the digital warning data is displayed on an aircraft cockpit display.

26. (PREVIOUSLY PRESENTED) The system of claim 6, wherein the ground-based

system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position, altitude and track to a minimum safe altitude profile and determining that the at least one aircraft should be warned if the position, altitude, and track of the at least one aircraft indicates that the at least one aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

27. (PREVIOUSLY PRESENTED) The system of claim 6, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the position, altitude, and track of a first of the at least one aircraft with the position, and altitude, and track of a second of at least one aircraft and determining that the at least one aircraft should be warned if the position, altitude, and track of the first of the at least one aircraft and the position, altitude, and track of the second of the at least one aircraft are within a predetermined range of one another or on course to come within a predetermined range of one another.

28. (PREVIOUSLY PRESENTED) The system of claim 6, wherein the ground-based system for comparing aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises means for comparing the at least one aircraft position, altitude, and track to an airport noise profile and determining that the at least one aircraft should be warned if the position, altitude, and track indicate that the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

29. (PREVIOUSLY PRESENTED D) The system of claim 6, wherein the means for warning the at least one aircraft comprises a means for generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

30. (PREVIOUSLY PRESENTED) The system of claim 6, wherein the means for warning the at least one aircraft comprises a means for generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

31. (PREVIOUSLY PRESENTED) The system of claim 30, wherein the means for warning the at least one aircraft comprises a digital data link to the aircraft, wherein digital warning data are broadcast to the aircraft from the ground, and the digital warning data is displayed on an aircraft cockpit display.

32. (PREVIOUSLY PRESENTED) A ground-based method for tracking and warning aircraft, comprising the steps of:

tracking in a ground-based system, at least one aircraft to determine aircraft position and altitude,

comparing in a ground-based system, aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned, and

warning the at least one aircraft.

33. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of tracking in a ground-based system comprises 3-D multilateration to determine aircraft position and altitude.

34. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of tracking in a ground-based system comprises 2-D multilateration to determine aircraft position and a receiving transponder data to determine aircraft altitude.

35. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of tracking in a ground-based system comprises the step of tracking using active radar.

36. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of tracking in a ground-based system comprises the step of tracking using passive radar.

37. (PREVIOUSLY PRESENTED) The method of claim 33, wherein the step of 3-D multilateration determines aircraft position, altitude, track and speed.

38. (PREVIOUSLY PRESENTED) The method of claim 34, wherein the step of 2-D multilateration determines aircraft position, track, and speed.

39. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position and altitude to a minimum safe altitude profile, and

determining that the at least one aircraft should be warned if the altitude of the at least one

aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

40. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the position and altitude of a first of the at least one aircraft with the position and altitude of a second of at least one aircraft, and

determining that the at least one aircraft should be warned if the position and altitude of the first of the at least one aircraft and the position and altitude of the second of the at least one aircraft are within a predetermined range of one another.

41. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position and altitude to an airport noise profile, and

determining that the at least one aircraft should be warned if the position and altitude of the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

42. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of warning the at least one aircraft comprises the step of generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

43. (PREVIOUSLY PRESENTED) The method of claim 32, wherein said step of warning the at least one aircraft comprises the step of generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

44. (PREVIOUSLY PRESENTED) The method of claim 43, wherein said step of warning the at least one aircraft comprises the steps of:

transmitting, over a digital data link, digital warning data to the aircraft from the ground, and

displaying the digital warning data on an aircraft cockpit display.

45. (PREVIOUSLY PRESENTED) The method of claim 33, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position and altitude to a minimum safe altitude profile, and

determining that the at least one aircraft should be warned if the altitude of the at least one aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

46. (PREVIOUSLY PRESENTED) The method of claim 33, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the position and altitude of a first of the at least one aircraft with the position and

altitude of a second of at least one aircraft, and

determining that the at least one aircraft should be warned if the position and altitude of the first of the at least one aircraft and the position and altitude of the second of the at least one aircraft are within a predetermined range of one another.

47. (PREVIOUSLY PRESENTED) The method of claim 33, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position and altitude to an airport noise profile, and

determining that the at least one aircraft should be warned if the position and altitude of the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

48. (PREVIOUSLY PRESENTED) The method of claim 33, wherein said step of warning the at least one aircraft comprises the step of generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

49. (PREVIOUSLY PRESENTED) The method of claim 33, wherein said step of warning the at least one aircraft comprises the step of generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

50. (PREVIOUSLY PRESENTED) The method of claim 49,wherein said step of warning the at least one aircraft comprises the steps of:

transmitting, over a digital data link, digital warning data to the aircraft from the ground,

and

displaying the digital warning data on an aircraft cockpit display.

51. (PREVIOUSLY PRESENTED) The method of claim 34, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position and altitude to a minimum safe altitude profile, and

determining that the at least one aircraft should be warned if the altitude of the at least one aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

52. (PREVIOUSLY PRESENTED) The method of claim 34, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the position and altitude of a first of the at least one aircraft with the position and altitude of a second of at least one aircraft, and

determining that the at least one aircraft should be warned if the position and altitude of the first of the at least one aircraft and the position and altitude of the second of the at least one aircraft are within a predetermined range of one another.

53. (PREVIOUSLY PRESENTED) The method of claim 34, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined

criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position and altitude to an airport noise profile, and

determining that the at least one aircraft should be warned if the position and altitude of the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

54. (PREVIOUSLY PRESENTED) The method of claim 34, wherein said step of warning the at least one aircraft comprises the step of generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

55. (PREVIOUSLY PRESENTED) The method of claim 34, wherein said step of warning the at least one aircraft comprises the step of generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

56. (PREVIOUSLY PRESENTED) The method of claim 55,wherein said step of warning the at least one aircraft comprises the steps of:

transmitting, over a digital data link, digital warning data to the aircraft from the ground, and

displaying the digital warning data on an aircraft cockpit display.

57. (PREVIOUSLY PRESENTED) The method of claim 37, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position, altitude and track to a minimum safe altitude

profile, and

determining that the at least one aircraft should be warned if the position, altitude, and track of the at least one aircraft indicates that the at least one aircraft is approaching or below that of a minimum safe altitude for the position of the at least one aircraft.

58. (PREVIOUSLY PRESENTED) The method of claim 37, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the position, altitude, and track of a first of the at least one aircraft with the position, and altitude, and track of a second of at least one aircraft, and

determining that the at least one aircraft should be warned if the position, altitude, and track of the first of the at least one aircraft and the position, altitude, and track of the second of the at least one aircraft are within a predetermined range of one another or on course to come within a predetermined range of one another.

59. (PREVIOUSLY PRESENTED) The method of claim 37, wherein said step of comparing in a ground-based system aircraft position and altitude to at least one predetermined criteria to determine whether the at least aircraft should be warned comprises the steps of:

comparing the at least one aircraft position, altitude, and track to an airport noise profile, and

determining that the at least one aircraft should be warned if the position, altitude, and track indicate that the at least one aircraft is approaching or exceeding a boundary of the airport noise profile.

60. (PREVIOUSLY PRESENTED) The method of claim 37, wherein said step of warning the at least one aircraft comprises the step of generating an audio radio message to the at least one aircraft so that a pilot of the at least one aircraft is audibly warned.

61. (PREVIOUSLY PRESENTED) The method of claim 37, wherein said step of warning the at least one aircraft comprises the step of generating a visual message to the at least one aircraft so that a pilot of the at least one aircraft is visually warned.

62. (PREVIOUSLY PRESENTED) The method of claim 61, wherein said step of warning the at least one aircraft comprises the steps of:

transmitting, over a digital data link, digital warning data to the aircraft from the ground, and

displaying the digital warning data on an aircraft cockpit display.